

REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

I. Disposition of Claims

Claims 1-22 were pending in this application. Claims 7-13, 21, and 22 have been cancelled in this reply. Claims 1 and 14 are independent. The remaining claims depend, directly or indirectly, from claims 1 and 14. Claims 1-6 and 14-20 have been amended in this reply. Claim 23 has been added in this reply. No new matter has been added by way of these amendments.

II. Election of Invention

In accordance with the provisional election of the invention of Group I, claims 7-13, 21, and 22 have been cancelled in this reply. Thus, Applicant confirms the election to prosecute claims 1-6 and 14- 20 *without* traverse. Applicant notes that the election was made in the telephone conversation on December 3, 2003 *without* traverse. Therefore, Applicant believes that the paragraph on p. 3 of the Action includes a typographical error when it characterizes the election as being made *with* traverse.

III. Claim Amendments

Claims 2-6 and 15-20 were amended to correct minor informalities. Claims 1 and 14 were amended to clarify the present invention. Further, claim 23 was added. The

support in the specification for the amendments to claims 1, 14, and 23 is discussed below.

In particular, claims 1 and 14 were amended to include “selectively measuring an inorganic carbonic acid concentration in an outlet water of an ion exchange resin vessel filled with [at least] an anion exchange resin, thereby avoiding influences from other acid ions.” On pages 23 and 24 of the instant specification, selective measurement is discussed through an example of an electric conductivity sensor. For example, the specification states, “[a]n electric conductivity sensor with a gas separation membrane includes a deionized water line separate from a sample water and the deionized water contact each other with a gas permeation membrane in between. The gas permeation membrane used here allows the carbon dioxide and other gases [to] permeate through, but does not allow ionic constituents and organic materials...It is clear from the above that because, in the conductivity sensor, the influence of any ionic constituents other than carbon dioxide is averted by the gas permeation membrane, the inorganic carbonic acid concentration can be measured accurately even for sample water having other ion constituents such as chloride and sulfuric acid ions.”

The above indicates clear support for claims 1, 14, and 23. Thus, the Applicant respectfully requests entering the claims as amended above.

IV. Rejection(s) under 35 U.S.C § 102

Claims 1-4 and 14-17 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,839,162 (“Ammer”). Claims 1 and 14 have been amended in this reply to clarify the present invention recited. To the extent that this rejection may still

apply to the amended claims, the rejection is respectfully traversed.

The Present Invention

The present invention relates to a method and apparatus for evaluating performance of an anion exchange resin. The method includes selectively measuring the inorganic carbonic acid concentration in the outlet water of an ion exchange resin vessel filled with at least an anion exchange resin. The selective measuring avoids influences from other acid ions. The method further includes evaluating the performance of the anion exchange resin filled in the ion exchange resin vessel based on the obtained measurement value of the inorganic carbonic acid concentration in the outlet water.

In another aspect, the present invention relates to a performance evaluation apparatus for anion exchange resins. The apparatus includes an outlet monitoring device for selectively measuring the inorganic carbonic acid concentration of the outlet water of an ion exchange resin vessel filled with an anion exchange resin. The outlet monitoring device for selective measuring avoids influences from other acid ions. Further, the apparatus includes an evaluation device for evaluating the performance of the anion exchange resin filling the ion exchange resin vessel based on the measurement value of the inorganic carbonic acid concentration of the outlet water obtained from the monitoring device.

Advantageously, the present invention allows accurate measurement of the carbonic acid concentration in the outlet water of an ion exchange resin vessel of a demineralization system to improve the evaluation of performance, *e.g.*, reactivity and degree of degradation.

The Present Invention v. Ammer

On the other hand, Ammer does not selectively measure carbonic acid concentrations. In fact, Ammer discloses measuring the ion concentration of outlet water of ion exchange treatment. However, the Applicant asserts that the measurement of ion concentration as shown by Ammer is not limited to selective measurement of carbonic acid ions. For example, Ammer states, [t]he pH difference is infallible indication of the exhaustion of the anion exchanger to be monitored. In this respect it does not matter whether weak or strong anions break through first, for example, traces of carbonic acid or silicic acid which break through are easily detected,” (col. 7, l. 66- col8. l. 4). The above clearly indicates that Ammer simply measures the ion concentration irrespective of the type of acid ion.

Claims 1 and 14 require that the carbonic acid concentration is *selectively* measured. Ammer is completely silent to this feature. Because Ammer does not show or suggest selectively measuring carbonic acid concentration, claims 1 and 14 are patentable over Ammer. Thus dependent claims 2-6 and 15-20 are patentable for at least the same reasons as discussed above.

V. Rejection(s) under 35 U.S.C § 103

Claims 5, 6, 18-20 were rejected under 35 U.S.C. § 103(a) as being obvious over Ammer in view of U.S Patent No. 5,902,883 (“Tasaki”). Claims 1 and 14 have been amended in this reply to clarify the present invention recited. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

Ammer fails to show or suggest the present invention as discussed above and Tasaki fails to provide that which Ammer lacks. In particular, Tasaki fails to teach or suggest selective measurement of carbonic acid ions. Tasaki is completely silent to this feature as required by amended claims 1 and 14. Because Tasaki fails to provide that which Ammer lacks with respect to selective measurement, claims 1 and 14 are patentable over Ammer and Tasaki, whether considered separately or in combination. Thus dependent claims 2-6 and 15-20 are patentable for at least the same reasons as discussed above.

VI. Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 08228/017001).

Respectfully submitted,

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